

Claims

- [c1] A method of automating validation comprising:
 - defining requirements;
 - selecting automated devices for manufacturing;
 - integrating automated devices in a production line, wherein integrating the automated devices comprises interconnecting the automated devices to a hub-box via communication links, the hub-box controls and facilitates communication between automated devices;
 - collecting processing data from the automated devices by the hub-box for analysis;
 - analyzing processing data to determine whether the requirements are satisfied; and
 - validating the process if the requirements are satisfied.
- [c2] The method of claim 1 wherein automating validation comprises automating validation in a pharmaceutical manufacturing facility.
- [c3] The method of claim 1 wherein selecting automated devices comprises grouping automated devices in at least one automated module.
- [c4] The method of claim 1 wherein selected automated de-

vices comprises grouping automated devices in a plurality of automated modules.

[c5] The method of claim 1 wherein collecting and analyzing data is performed substantially on a real-time basis to provide continuous and concurrent validation.

[c6] The method of claim 1 further comprises reviewing and planning corrective actions when analyzing the processing data that determines that the requirements are not satisfied.

[c7] The method of claim 6 wherein the corrective actions comprise changing requirements.

[c8] The method of claim 1 further comprises generating commands to adjust process parameters based on results of analyzing the processing data.

[c9] The method of claim 1 wherein collecting processing data comprises collecting processing data for validation according to the defined requirements.

[c10] The method of claim 1 wherein integrating the automated devices comprises interconnecting the automated devices to a plurality of hub-boxes via communication links, the hub-boxes control and facilitate communication between automated devices.

- [c11] The method of claim 1 further comprises assessing automated equipments after defining the requirements, wherein assessing the automated equipment comprises coupling proposed automated equipment to the hub-box to assess the proposed automated equipment.
- [c12] The method of claim 1 further comprises providing a generic interface unit for facilitating communication between the hub-box and automated modules.
- [c13] The method of claim 12 wherein providing the generic interface unit comprises providing a generic interface for each automated module.
- [c14] The method of claim 13 wherein the generic interface includes communication links for each automated device of the automated module.
- [c15] The method of claim 12 wherein the generic interface includes communication links for each automated device of the automated module.
- [c16] The method of claim 1 further comprises providing a plurality of hub-boxes which are interconnected.
- [c17] The method of claim 16 wherein at least one of the plurality of hub-boxes serves as a redundant hub-box.

[c18] A virtual platform for automated production comprising:
a plurality of automated modules, an automated module comprising at least one automated device; and
at least one hub-box comprising
a hub for controlling a plurality of automated modules,
wherein the hub collects, processes and stores data from the automated modules, and
a plurality of generic interface units for facilitating communication between the hub and the automated modules, wherein a generic interface unit and the automated module communicate using a first communication protocol, the generic interface unit and the hub communicate using a second communication protocol,
wherein the hub-box provides a virtual link between co-operating automated devices.

[c19] A virtual platform for automated production comprising:
a plurality of automated modules, an automated module comprising at least one automated device; and
a plurality of hub-boxes that are interconnected by a distribution system, wherein a hub-box comprises
a hub for controlling a plurality of automated modules,
wherein the hub collects, processes and stores data from the automated modules, and
a plurality of generic interface units for facilitating communication between the hub and the automated mod-

ules, wherein a generic interface unit and the automated module communicate using a first communication protocol, the generic interface unit and the hub communicate using a second communication protocol, wherein the hub-box provides a virtual link between co-operating automated devices.

[c20] A virtual platform for automated production comprising: a plurality of automated modules, an automated module comprising at least one automated device; at least one hub-box comprising a hub for controlling a plurality of automated modules, wherein the hub comprises a change database for recording change history and a manufacturing information database for recording information related to manufacturing processes, a plurality of generic interface units for facilitating communication between the hub and the automated modules, wherein a generic interface unit and the automated module communicate using a first communication protocol, the generic interface unit and the hub communicate using a second communication protocol; and an external interface for providing remote access by an external party.